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A new species of *Tyrannomyrmex* (Hymenoptera: Formicidae) from Sri Lanka

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Abstract

Tyrannomyrmex legatus sp. nov. is described based on a single worker collected from leaf litter in dipterocarp forest in southern Sri Lanka. A key is presented to separate the three known species of *Tyrannomyrmex*. A probable male specimen of the genus from the Philippines is noted. *Tyrannomyrmex* is placed within the tribe Solenopsidini and close to the genus *Monomorium*.

Key words: Ants, Sri Lanka, *Tyrannomyrmex*, new species, taxonomy

Introduction

In 2003, Fernández described a new genus and species, *Tyrannomyrmex rex*, from peninsular Malaysia based on a single specimen collected from leaf litter at Negri Sembilan, Pasoh Forest Reserve in 1994 (Fernández 2003). Fernández was unable to place the new genus in any existing myrmicine tribe although several potential candidates were considered including the Adelomyrmecini and Solenopsidini. Without additional specimens or molecular data this genus was temporarily placed as *incertae sedis* within the subfamily Myrmicinae. Since then, a second species, *T. dux* Borowiec has been described based on a single specimen collected from leaf litter in southern India in 1999 (Borowiec 2007). In addition, Brian Heterick (pers. obs.) recognized a single male collected from a light trap in the Philippines in 1965 as possibly representing the male of an otherwise unknown species of *Tyrannomyrmex*.

A single worker of a third species of *Tyrannomyrmex*, described here, was collected by Nihara R. Gunawardene in 2006 from leaf litter in a lowland dipterocarp undisturbed forest in southern Sri Lanka. This species is generally similar to the two previously described species of *Tyrannomyrmex*; all species have small eyes reduced to a few ommatidia, an 11-segmented antenna with an ill-defined 3-segmented club (Fig. 3), palpal formula 2-2, and a masticatory border largely edentate with two apical teeth.

The discovery and description of this third species of *Tyrannomyrmex* expands the known range of this rare genus and clarifies its placement close to the genus *Monomorium*, an unexpected finding. The character states selected by Bolton in his *Synopsis and Classification of Formicidae* (2003) have become a valuable tool in the placement of ant genera. New generic descriptions should include these character states for future comparisons and an attempt should be made to expand the list of characters.

Methods and terminology

This specimen was collected in a 1 m² quadrat of leaf litter which was sifted in the field. The litter was placed in a mini-winkler for 48 hours with a thorough shake at 24 hours. The specimen was killed and preserved in methylated spirits for up to five days and then removed and stored in 70% isopropyl alcohol. The specimen was pinned within a few days of storage in isopropyl alcohol.

Specimens were examined and all measurements were made using a Leica MZ16 stereomicroscope at 100 - 185X magnification. All measurements are in mm. Digital images were taken with a JVC digital camera and processed using Auto-Montage (Synchrosopy, Division of Synoptics, LTD) software. Images were cleaned and adjusted using Adobe Photoshop CS.

Morphological measurements follow the terminology of Fernández (2003) and Borowiec (2007) and include: (HW) Head width: Maximum head width in full face view excluding the eyes; (HL) Head length: Maximum head length in full face view excluding the mandibles; (EL) Eye length: Maximum diameter of compound eye; (SL) Scape length: Maximum scape length measured without condyle and neck; (PrW) Pronotal width: Maximum width of pronotum in dorsal view; (ML) Mesosoma length: In side view, maximum longitudinal distance from posteroventral corner of mesosoma to the farthest point on anterior face of pronotum, excluding the neck; (PL) Petiole length: Maximum petiole length in side view; PPL Postpetiole length: Maximum postpetiole length in side view; (PW) Petiole width: Maximum petiole width in dorsal view; (PPW) Postpetiole width: Maximum postpetiole width in dorsal view; (GL) Gaster length: Maximum length measured in side view; (TL) Total length: Sum of HL+ML+PL+PPL+GL; (CI) Cephalic index: HW/HL x 100; (SI) Scape index: SL/HW x 100

Key to workers of *Tyrannomyrmex*

1. Erect hairs on mesosomal dorsum very short, confined to anterior of pronotum, foveolae small and sparse, individual foveolae widely separated. Peninsular Malaysia *rex*
- Dorsum of mesosoma with numerous long erect hairs scattered over the entire surface, foveolae large and dense, individual foveolae approximate to each other (Figs. 1, 2) 2
2. In lateral view, peduncle of petiole clearly differentiated and extending gradually into the node. Anteroventral projection of petiole absent. India *dux*
- In lateral view, peduncle of petiole lacking or nearly lacking, not clearly differentiated from the node (Fig. 1). Anteroventral projection of petiole present. Sri Lanka *legatus*

Description

Tyrannomyrmex legatus sp. nov.

(Figs. 1–3)

Holotype worker. Sri Lanka, Sinharaja Forest Reserve, N 06° 24.697'–N 06° 24.823'; E80° 25.123'–E 80° 24.991', 432m–571m, 25 MAR–07APR 2006, N.R. Gunawardene, CTFS Plot Winkler sacks 15–18. MCZ holotype number 35624 (CASENT0106177, ANTC4038).

Holotype deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA. The specimen and collection labels have been imaged and placed on AntWiki (<http://www.antwiki.org>).

Worker measurements. HW 0.52, HL 0.72, EL 0.05, SL 0.54, PrW 0.47, ML 0.99, PL 0.35, PPL 0.22, PW 0.29, PPW 0.28, GL 0.76, TL 3.04, CI 72, SI 104.

Description of worker. General appearance as in Fig. 1. Head in full face view longer than wide, sides and posterior margins rounded, sides slightly tapering anteriorly. Mandibles triangular, masticatory margin edentate except for two blunt apical teeth, subapical tooth close to and slightly smaller than apical tooth. When mandibles closed, gap at masticatory margin v-shaped. Palp formula 2, 2. Clypeal anterior margin protrudes above mandibles and is thickened, bearing several straight, stiff hairs, clypeus posteriorly narrowly inserted between frontal lobes. Clypeus lacking carinae, bearing a few irregular shaped foveolae. Frontal lobes present and short but prominent, rounded and obscuring antennal sockets. Antennae 11-segmented with weakly defined three-segmented club, apical segment being largest and entire club equal in length to rest of funiculus, excluding pedicel. Scape shallowly curved at base, relatively short, not reaching posterior margin of head. Eyes small and irregular, composed of 4 or 5 poorly defined ommatidia and situated slightly anterior to midlength of head. Mesosoma without promesonotal or metanotal suture, forming a slightly convex outline in side view. In dorsal view mesosoma is widest in promesonotal area, decreasing in width posteriorly. Anteroventral corner of pronotum rounded. Propodeum armed with two very small, triangular denticles. Propodeal lobes broad and rounded. Petiole without clearly differentiated peduncle, in side view node somewhat thickened and rounded, anterior face less rounded than posterior face, in dorsal view longer than wide. Anteroventral lobe or projection present. Postpetiole wider than long; in dorsal view anterior margin concave and posterior margin convex. First gastral tergite covered with microreticulum fading well before half of its length, remainder of gaster smooth. Middle and hind legs without tibial spurs. All surfaces of the head, mesosoma, petiole and postpetiole completely covered with numerous large round foveolae almost touching

each other. Space between foveolae smooth and shiny. Long, stiff, erect, white hairs emerging from the center of each foveola. Abundant erect hairs present on body appendages, including antennal scape as well as funiculus; hairs present on all leg segments and on both dorsal and ventral surfaces of mandibles; those on ventral surface not differing visibly in structure from rest of pilosity. Body color reddish, appendages a lighter reddish color.



FIGURES 1–3. *Tyrannomyrmex legatus*, holotype worker; 1—lateral view; 2—dorsal view; 3—frontal view.

Gyne and male: Unknown.

Etymology. “legatus” refers to a military commander appointed by the Roman Senate.

Diagnosis. *Tyrannomyrmex legatus* is most easily distinguished from *T. rex* and *T. dux* by differences in pilosity, sculpture and the shape of the petiole and postpetiole. *T. rex* is almost lacking pilosity on the mesosomal dorsum, while the whole dorsal surface is covered with long erect hairs in *T. legatus* and *T. dux*. The foveolation is weaker in *T. rex*, especially on the mesosoma where the foveae on the mesosoma are small with most interspaces equal or wider than their diameter. *Tyrannomyrmex legatus* can be most easily separated from *T. dux* by the shape of the petiole, which is much more robust in the former. In lateral view, the peduncle of the petiole is not clearly differentiated, with an abrupt anterior slope of the node. There is also a conspicuous anteroventral projection of the petiole in *T. legatus* which is absent in *T. dux*.

Distribution and Habits. This single specimen was collected in lowland dipterocarp forest (undisturbed, unlogged), near a stream at the bottom of a slope in the drier period of the year.

Discussion

The small eyes, edentate mandibles, and close similarity among the workers of all three *Tyrannomyrmex* species strongly suggest that they may also be similar ecologically, and that they are probably subterranean and predaceous. While the three known worker specimens have been taken in leaf litter samples, the rarity of collections suggests that *Tyrannomyrmex* species may both nest and forage in the deeper soil horizons, and that foragers may only occasionally enter the leaf litter layers closer to the surface.

So far, all species of *Tyrannomyrmex* occur in tropical Old World forests. The wide distribution range from India and Sri Lanka in the west to peninsular Malaysia and perhaps the Philippine archipelago in the east suggests that more species may be discovered as we improve our ability to sample deeper soil microhabitats. New probe techniques for sampling below the leaf litter layer hold promise for discovering more of this subterranean ant community (Ryder-Wilkie *et al.* 2007).

Based upon the additional analysis of *T. legatus*, the following morphological characters for the genus are summarized below:

- Mandibles with two teeth in the masticatory border, apical and smaller subapical. No teeth on the basal margin of the mandible.
- Inner ventral margin of masticatory border of mandibles with setae. Setae can be normal or modified.
- Clypeus devoid of carinae. Foveolae may be present.
- Palpal formula 2, 2.
- Compound eyes small, reduced to a few ommatidia.
- Antennae 11-segmented with an ill-defined 3-segmented club.
- Frontal carinae and antennal scrobes absent.
- Mesosoma without promesonotal suture.
- Propodeal lobes large and round.
- Sting large and robust.

Tyrannomyrmex legatus has its sting extruded and it is comparable in length with *T. dux*. It is possible that a fully extruded sting could appear to be longer as in *T. rex*. The palp formula is 2,2 and each segment is rather short. The setae on the ventral margin of the mandibles are normal. There is no median seta on the anterior margin of the clypeus, but rather a series of evenly spaced setae along the entire margin.

Fernández (2003) provisionally concluded that *Tyrannomyrmex* is a distinct and isolated genus within the subfamily Myrmicinae with possible affinities to either the *Adelomyrmex*-genus group or the tribe *Solenopsidini*. In a comprehensive treatment of the Formicidae, Bolton (2003) lists in Appendix 2, a set of character states for all ant genera. Antennomere count, presence and type of antennal club, palp formula, total dental count and spur formula are scored for each genus. Using this set of characters, a matrix was constructed which forms the foundation of a LUCID Key to the Extant Ant Genera of the World at <http://gap.entclub.org/index.html>. *Tyrannomyrmex* and the genus *Monomorium* uniquely share the same character states in this key.

Bolton (2003) constructs a diagnosis for the tribe Solenopsidini and lists a set of characters that encompass *Tyrannomyrmex* along with 17 other genera including *Monomorium*. Specifically all members have mandibles subtriangular to triangular and short; total dental count 2-6; anterior clypeal margin with or without an isolated stout median seta; clypeus bicarinate and usually distinct; frontal lobes small and narrow, with straight to convex outer margins; antennal scrobes and frontal carinae usually absent; dorsal mesosoma without promesonotal suture; metatibial spur simple to absent; propodeal lobes broad and rounded; tergite of abdominal segment IV broadly overlapping sternite on ventral surface of gaster; head and dorsal mesosoma usually smooth or weakly sculptured; antenna with 7-12 segments, with a 2, 3, or 4-segmented club. *Tyrannomyrmex* falls well within this schema including its strong surface sculpture which is shared with a number of Australian *Monomorium* species, some species of the *Monomorium scabriceps* group, some *Oxyepoecus*, *Mayriella* and some major workers of *Oligomyrmex* (Bolton, 2003).

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